

MONTHLY WEATHER REVIEW.

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INTRODUCTION.

The MONTHLY WEATHER REVIEW for April, 1903, is based on data from about 3300 stations, classified as follows:

Weather Bureau stations, regular, telegraph and mail, 160; West Indian service, cable and mail, 8; River and Flood service, 52, river and rainfall, 177, rainfall only 62; voluntary observers, domestic and foreign, 2565; total Weather Bureau Service, 2962; Canadian Meteorological Service, by telegraph and mail, 20, by mail only, 13; Meteorological Service of the Azores, by cable, 2; Meteorological Office, London, by cable, 8; Mexican Telegraph Company, by cable, 3; Army Post Hospital reports, 18; United States Life-Saving Service, 9; Southern Pacific Company, 96; Hawaiian Meteorological Service, 75; Jamaica Weather Service, 130; Costa Rican Meteorological Service, 25; The New Panama Canal Company, 5; Central Meteorological Observatory of Mexico, 20 station summaries, also printed daily bulletins and charts, based on simultaneous observations at about 40 stations; Mexican Federal Telegraph Service, printed daily charts, based on about 30 stations.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Mr. Curtis J. Lyons, Territorial Meteorologist, Honolulu, H. I.; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt. S. I. Kimball, Superintendent of the United States Life-Saving Service; Lieut. Commander W. H. H. Southerland, Hydrographer, United States Navy; H. Pittier, Director of the Physico-Geographic Institute, San José,

Costa Rica; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. M. Shaw, Esq., Secretary, Meteorological Office, London; Rev. Josef Algué, S. J., Director, Philippine Weather Service; and H. H. Cousins, Chemist, in charge of the Jamaica Weather Office.

Attention is called to the fact that the clocks and self-registers at regular Weather Bureau stations are all set to seventy-fifth meridian or eastern standard time, which is exactly five hours behind Greenwich time; as far as practicable, only this standard of time is used in the text of the REVIEW, since all Weather Bureau observations are required to be taken and recorded by it. The standards used by the public in the United States and Canada and by the voluntary observers are believed to conform generally to the modern international system of standard meridians, one hour apart, beginning with Greenwich. The Hawaiian standard meridian is $157^{\circ} 30'$, or $10^{\text{h}} 30^{\text{m}}$ west of Greenwich. The Costa Rican standard of time is that of San José, $0^{\text{h}} 36^{\text{m}} 13^{\text{s}}$ slower than seventy-fifth meridian time, corresponding to $5^{\text{h}} 36^{\text{m}}$ west of Greenwich. Records of miscellaneous phenomena that are reported occasionally in other standards of time by voluntary observers or newspaper correspondents are sometimes corrected to agree with the eastern standard; otherwise, the local standard is mentioned.

Barometric pressures, whether "station pressures" or "sea-level pressures," are now reduced to standard gravity, so that they express pressure in a standard system of absolute measures.

FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

Over northwestern continental Europe unusually severe weather during the first and second decades of the month culminated on the 19th and 20th with gales, snow, and low temperature over Germany, northern Russia, and the Scandinavian Peninsula.

During the first and third decades of the month several storms of moderate strength advanced from the Atlantic Ocean over the British Isles, those of the first decade passing to the north, and those of the third decade over the southern part of Great Britain.

Storms.—On the 3d and 4th, and from the 14th to the 17th, stormy weather prevailed along the middle and north Atlantic coasts of the United States, and during the latter period northeast gales of 40 to 60 miles an hour detained many vessels in north Atlantic ports. The gales of the Gulf of Mexico and the Pacific coast were not severe. On the 3d a well-defined storm, with snow and low temperature, swept from the upper Lake region over the Ohio Valley and New York, and from the 12th to 14th, and on the 29th and 30th, stormy weather prevailed in the Lake region. Ample and timely warning was given of the approach of all storms that visited the sea coasts and Great Lakes of the United States.

Cold waves.—The most important cold wave of the month set in over the northern Rocky Mountain and Plateau districts on the 27th, extended over the Northwestern States, with snow from the northern Plateau over Wyoming and Montana dur-

ing the 28th, and on the 29th covered the Middle-western and Northwestern States, with snow in Wyoming, Colorado, South Dakota, and Nebraska. At the close of the month this cold wave extended from the upper Lake region over the upper and middle Mississippi Valley and the Southwestern States, with freezing temperature to northwestern Texas, and snow in the upper Lake region, Iowa, Missouri, and Illinois.

Frosts.—The following press comments have been made regarding the warnings of frost and freezing weather that were issued during the month:

Macon, Ga., Telegraph, April 6, 1903:

As predicted, Georgia, the interior of Alabama and of Mississippi were visited by frosts yesterday morning—light, however, except in exposed places, and where the breeze was less. The warnings issued by the Weather Bureau were generally heeded, and much was done to save flowers and small garden truck of tender varieties.

Wilmington, N. C., Star, April 7, 1903:

Reports are conflicting as to the extent of the damage to truck crops in this section by reason of Saturday and Sunday's cold snap. The timely warning issued early by the Weather Bureau and its rapid dissemination by the railroads and others no doubt reduced the injury to a minimum, but the damage, of course, was something.

Newbern, N. C., Journal, April 10, 1903, editorial:

The recent freezing weather through which the truck crops of this vicinity passed and escaped destruction, suffering but little damage, is a matter of more than mere congratulation, it is a blessing for which every one is profoundly and truly thankful.

The natural climatic conditions of this section for early truck crops, and for that matter for all crops throughout the year, together with favorable soil conditions, place the agriculturists of this section most advantageously in position to make good crops when other sections are afflicted with adverse conditions.

An important factor of assistance to the farmers in this vicinity is the Weather Bureau service, with its forecasts of weather changes.

At all seasons this service is found of great benefit, and at no time has it proven more valuable than in its forecasts of last week, forecasting the severe weather change and great fall in temperature, enabling the truckers to make all possible efforts to offset the impending frost or freeze.

While this section, as already stated, suffered little from the freezing weather, the Weather Bureau warning made it possible for the truckers to take many precautions which without the forecast they would not have taken.

That the Weather Bureau service is of incalculable value to the farmers of this section every one will bear ample and full testimony. Its reports are eagerly looked for and its forecasts are heeded, every farmer being an inquirer during the season as to what the daily forecast may be.

The Daily States, New Orleans, La., May 1, 1903:

The warnings of the United States Weather Bureau for these frosts, although so much out of season, have been, as usual, exceptionally accurate. They were so timely as to enable protection of the extensive and valuable truck farming interests of the Southwest, which means the saving of thousands of dollars to this industry.

The Daily Picayune, New Orleans, La., May 2, 1903:

This is perhaps the most general and severe frost that has ever visited the Southwest so late in the spring. Just what the effects will be on the general crops can not be even conjectured. Trucking interests, which have reached enormous proportions during recent years in Louisiana and Texas, are likely to suffer the greatest damage from such unseasonable frost, as it is impossible at this time to protect all crops. However, the accurate warnings issued by the United States Weather Bureau were, through its complete and perfect system of distribution, placed in the hands of every truck-growing community which was threatened with frost by 9 a. m. Thursday, and this gave the growers time to protect extensively. Thus, the Weather Bureau has again saved the farmers of this section several hundred thousand dollars, as it has done in the case of every occurrence of severe weather in recent years. It is a notable fact that no severe weather makes its appearance without its approach being heralded by the ever-alert and efficient Weather Bureau forecasters.

In the latter part of the month the peach crop in southern Oregon was damaged by frost. The frost was accurately forecast, but protective measures are not generally employed in that section.

Flood.—At New Orleans the Mississippi River reached the highest stage of the flood of 1903, 20.4 feet on April 6 and 7, and for a few hours the stage was reported at 20.7 feet.

The Washington Post, of April 19, 1903, comments, editorially, as follows, regarding the work of the Weather Bureau:

The newspapers published in the lower Mississippi Valley pay high tribute to the Weather Bureau, acknowledging the accuracy of its predictions and their immense value to the people of that section. The New Orleans Times-Democrat says, for example:

"Before the organization of the old Signal Service, later changed to the Weather Bureau, the cane crop of Louisiana was frequently cut down one-half or three-fourths by the sudden descent of a freeze on the sugar district without a word of warning. To-day that is impossible. That problem in meteorology has been solved. The Weather Bureau may err in its 'probabilities' as to rain, but not as to a cold wave, and with telegraphic communication with the great Northwest, from which our cold weather comes, it is able to foretell the approach of a freeze four, five, and sometimes six days in advance. By the splendid system adopted for the dissemination of cold-wave signals, every planter in Louisiana is informed within a few hours of the prospective freeze, and is thus given ample time for preparation, and is able to windrow his cane or otherwise protect himself.

"We have been placed this year under another obligation to the Weather Bureau for its high-water news and predictions. It has kept the people of the lower Mississippi well informed of what they may expect in the way of high water, and its predictions have been subsequently verified by the facts."

It is easy for gentlemen in towns and cities, especially those who have no more than an idle and capricious interest in the weather, to sneer at the work of the Bureau when some of its least important forecasts fail of verification. An unexpected shower will interfere with the projected golf play or spoil a match of lawn tennis, and this is provocation enough for petulant and contemptuous criticism. But serious men engaged in serious occupations all over the country have cause to regard the Bureau as one of the most useful and beneficent of our Governmental institu-

tions. Indeed, it is more than a mere utility maintained at the expense of the taxpayers; it is an agency of incalculable profit to the whole people. It saves each year to the shipping, the insurance, and the agricultural interests, and to scores of other interests, subordinate to or involved in them, more money than is required to maintain the Bureau itself a thousand times over. The producers, the toilers, the millions depending for subsistence upon our great national industries, have never made, and will never make an investment even distantly approaching this in the matter of opulent returns.

BOSTON FORECAST DISTRICT.

Storm warnings were issued on the 2d, 3d, 4th, 7th, 8th, 14th, 15th, 16th, 17th, and 30th. During the storm of the 14th to 17th a persistent northeaster prevailed and shipping was tied up for a period of from four to six days. Warnings were displayed from twelve to eighteen hours in advance of the storm, and to this information was doubtless due the absence of loss of life and wreck of vessels. The press and the public generally gave due credit to the Bureau for its good work.—*J. W. Smith, Forecast Official.*

NEW ORLEANS FORECAST DISTRICT.

Several disturbances of moderate intensity crossed the district during the month. High winds occurred at some stations along the Gulf coast on the 3d, 4th, 13th, 14th, 29th, and 30th, for each of which timely warnings were issued. Very little rain fell in many parts of the district. Conditions were such as to warrant forecasts for showers on several occasions, but only inappreciable rainfall occurred, except in isolated cases, until the 29th, when general showers and, in some sections, good rains fell, for which forecasts were issued.

The temperature was generally below the normal, and the month closed as one of the coldest on record. Cold wave warnings were issued for Oklahoma on the 29th; the temperature fell 28° and to a minimum of 32° on the 30th. Warnings for general frosts for the greater portion of the district and heavy and probably killing frosts in the northern portion were issued April 30. Heavy and in some places killing frosts occurred in the northern portion of the district, and frost was reported well southward on May 1. These warnings saved several thousand dollars to trucking interests.

The river reached its highest stage, 20.4 feet, April 6 and 7. For a few hours at a time the stage was reported at 20.7 feet. The break in the levee 40 miles above New Orleans, known as the Hymelia crevasse, has not been closed. The cribbing around the break was joined April 6, but 200 feet of this washed out during the 8th and 9th, and the water cut a channel 30 feet deep. All efforts to stop the flow of water through the crevasse have been unsuccessful, but the work has not been abandoned. The river has been falling slowly since April 8.—*I. M. Cline, Forecast Official.*

CHICAGO FORECAST DISTRICT.

The regular season of navigation opened April 1, much earlier than usual. Several storms passed over the Lakes during the month and warnings were displayed with great frequency.

Southeast warnings were ordered in the afternoon of the 1st and changed to northwest in the morning of the 2d and to northeast in the morning of the 3d on Lakes Michigan and Huron. The storm advanced from the Rocky Mountain region with increasing force and caused high winds at nearly all stations on the 2d and 3d. Another storm developed in the west, for which southeast warnings were ordered on the upper Lakes at 6 p. m. of the 10th. Northeast warnings were ordered on Lakes Michigan and Huron at 10 a. m. of the 12th. They were changed to northwest warnings on the morning of the 13th and were continued for forty-eight hours. The storm moved very slowly and dangerous winds prevailed over the upper lakes for an unusually long period. Northwest warn-